



## Physical Anthropology Section – 2010

### H73 Decomposition in Water: The Effects of Climate on the Rate of Decay in New England

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The goals of this presentation are to educate attendees on the differences in the rate of decay in New England versus regions with temperate climates and to bring to attention the gap in the literature in regards to both cold climate and water decomposition.

This presentation will impact the forensic community by helping medical examiners and forensic pathologists become more accurate in their postmortem interval estimations. This will, in turn, aid lawyers and investigators because they can establish a more accurate timeline of events and corroborate alibis more efficiently. Families of victims will also be aided by this work because accurate time since death estimations can help medical examiners and medicolegal death investigators identify decedents that might have otherwise remained unidentified.

New England experiences variable weather throughout the year. New England winters are often very cold and dry, while summers are mostly warm and humid. After attending this presentation, the audience will realize the significance of the gap in the literature about cold climate decomposition and decomposition in water. The audience will also understand the differences in the rate of decay in New England versus the hot, humid environments, in which much of the research on decomposition in the United States has taken place.

Medical examiners, forensic pathologists, medicolegal death investigators, and forensic anthropologists benefit immensely from decomposition studies.<sup>1</sup> Previous research that has focused on decomposition has been conducted in different environments, which aids forensic investigators who recover human remains in trying to identify the decedents and estimate time since death.<sup>2</sup> Compounding variables, such as ambient temperature, geographic location, and predator activity, make the task of gleaning information from a body very difficult.<sup>7</sup> Decomposition studies considering these real-life variables are essential for investigators to perform their duties most efficiently.

Cold climate and water both serve to decrease the rate of decay significantly.<sup>3</sup> Ambient temperature influences the rate of decay dramatically; yet, decomposition studies have been performed mostly in temperate climates.<sup>5</sup> Similar experiments must be carried out in different regions of the world with differing environmental conditions.<sup>4</sup> In regard to water decomposition, much of what is known on the subject comes from case studies. Many bodies are found in water every year at different stages of decomposition. There is still much to be determined about how aquatic environments influence the process of decomposition on a stage-to-stage level.<sup>6</sup> Studies must be performed to determine what factors are affected and how when a body is found in the presence of water. Systematic studies on decomposition in water are also necessary to test and confirm hypotheses about how water affects the rate of decay.

This presentation will exhibit the results of a systematic research project on fetal pig decomposition in water performed in two phases. Phase I was performed between the months of February and May of 2009 in a wooded environment in New England. Phase II was performed in July of 2009 in the same environment. Four pigs were used in each phase of the project. Each pig was initially submerged in water in a plastic five-gallon bucket. In each phase, two pigs were placed in salt water and two pigs were placed in fresh water. The saltwater came from an urban beach in Boston, MA and the freshwater was taken from stagnant water in an old cranberry bog. The buckets were kept in aerated cages to prevent vertebrate scavenging; however, the cages permitted insect activity. The carrion in Phase II displayed a rapid rate of decay compared to the carrion in Phase I. Each pig decayed differently, but trends were recognized. Preliminary results indicate that water temperature is the most significant determining factor when considering the rate of decay. Results also showed that the water in each bucket (both fresh water and salt water) became more alkaline over time.

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#### References:

- <sup>1</sup> Bunch AW. The impact of cold climate on the decomposition process. *J Forensic Identification* 2009; 59(1):26-44.
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- <sup>6</sup> Anderson GS, Hobischak NR. Decomposition of carrion in the marine environment in British Columbia, Canada. *Int J Legal Med* 2004;118:206-209.
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### **Forensic Anthropology, Aqueous Environments, Time Since Death**